31.07.2012

BEREC public consultations on Net Neutrality – 29 May 2012
Summary of EBU views

− The EBU welcomes the opportunity to respond to the three BEREC documents (i.e. Draft guidelines for Quality of Service in the scope of Net Neutrality; Draft report on an assessment of IP-interconnection in the context of Net Neutrality; Draft report on differentiation practices and related competition issues in the scope of Net Neutrality). They each provide a comprehensive and well balanced analysis of the recent tendencies and practices as well as the available tools to safeguard net neutrality.

− Effective, consistent implementation and enforcement by Member States of the Telecom Package net neutrality principles (i.e. freedom of access, transparency, non-discrimination and quality of service) is a key condition/prerequisite for guaranteeing an open Internet. Member States' legislation should ensure that everyone can access and distribute the content or run applications and services of their choice, on the device of their choice. It should also safeguard the ability of content and application providers to access end users "without permission" so that consumers are delivered the choice they expect – not just what's currently popular or profitable.

− Transparency requirements as such are vital but not sufficient. Other equally essential rules to preserve the Internet's openness relate to the principles that traffic blocking is prohibited, that traffic management should be reasonable and that minimum quality of service should be safeguarded. It is therefore essential that BEREC empowers National Regulatory Authorities (NRAs) with the necessary detailed trigger criteria for action to ensure compliance with regard to each of these criteria.

− The EBU and its Members are fully committed to an open, transparent and secure Internet. The Internet has become an essential platform for public service media for delivering services to consumers and interacting with audiences in unprecedented ways. It is the PSM remit to be universally available on all platforms reaching all segments of society. Moreover, PSM drive innovation and actively contribute to the open Internet's success (or the Internet take up) with the development of new services, new formats, new technologies and high quality content.

− End-users should have access to all legal content on the open Internet with a sufficient level of quality of service (QoS) and without extra charges. The universal service mechanism is an important tool to create an inclusive digital society and the extension of this mechanism to the best effort Internet should thus be part of a broader reflection process on a comprehensive policy approach to secure the EU "broadband for all" objectives, alongside measures to promote the use of minimum coverage and quality requirements for spectrum allocation for wireless broadband.

− Net neutrality principles will be of increasing importance, particularly in the connected TV world, and are a fundamental instrument (as are must-carry rules

on broadcasting networks) to preserve fundamental general interest objectives such as freedom of expression, media pluralism and cultural diversity. There is an inevitable link between the regulation of transmission and the regulation of content which must be taken into account. Some have proposed there may be a "special case" for content serving a specific democratic or social purpose.[1] Should the Open Internet not be maintained, then the political pressure to move towards solutions such as this will increase.

− As a general principle, ISPs should not be allowed to block any content. Any traffic management practices (i.e. throttling) on the public open Internet should be kept to a minimum and should be allowed only in specific cases (i.e. to alleviate congestion on the network during peak times and to comply with a legal justification or Court order). Discriminatory and anti-competitive traffic management practices shall be prohibited. We welcome BEREC's recognition of the risk of market foreclosure by vertically-integrated players; the barriers to achieving transparency and minimal switching costs suggest that this risk is likely to persist.

− Differentiated treatment of traffic or differentiation of practices shall be allowed as long as the same types of services are treated equally.

− Transparency and users awareness about Internet access offers and traffic management and differentiation practices is of key importance. End-users need reliable and real-time information on traffic data. PSM have started to develop specific software to track problems in order to assist their audiences.

− Moreover, it is of fundamental importance that specialised (or managed) services should not be offered by ISPs at the expense of the development of the open public Internet and should not prevent access with sufficient QoS to content provided by PSM which has to be universally available across platforms. Operators of such managed services must be required to make their services available on fair, reasonable and non-discriminatory (FRAND). The open public Internet should remain the 'norm' not become the exception. The public service value of the Internet should not be harmed.

− Investment in additional capacity and advanced technical solutions for efficient traffic delivery should go hand in hand and are key to secure the open nature of the Internet. These are the best guarantees for an optimal viewer experience. Indeed, it is by maintaining an open Internet that the incentives to invest in networks and superfast broadband are likely to be optimized.[2]

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[1] eg. Ofcom stated: *"One potential special case which is worthy of note is where the content provider is providing public service content. As noted earlier in the document, we attach particular importance to citizens being able to access news, views and information over the internet, and public service content is important in this context, in particular because of the level of trust placed in news provided by public service broadcasters. Public service broadcasters are currently able to ensure delivery of their content over traditional TV platforms, by means of 'must carry' obligations placed on those platforms. There is a question as to whether similar obligations should apply to public service content delivered online, and if so, what commercial arrangements should apply. We regard this as a matter of public policy, to be decided by government."* Paragraph 4.51, Ofcom's approach to net neutrality, November 2011.
[2] This was consistent with the findings of the FCC which stated: *"Some commenters contend that open Internet rules are likely to reduce investment in broadband deployment. We disagree. There is no evidence that prior open Internet obligations have discouraged investment; and numerous commenters explain that, by preserving the virtuous circle of innovation, open Internet rules will increase incentives to invest in broadband infrastructure."* FCC. 23 September 2011. "Preserving the open Internet." Federal Register, Vol. 76, No. 185. Economic analysis of the incentives supports this view. Rather than investing in

– Traffic management techniques should not be used as a means to avoid the necessary investments in additional capacity. With a view to reaching the ambitious European broadband connection targets, substantial investments in additional capacity are needed. In so far traffic differentiation practices are based on concerns over network congestion, maintaining these practices act as a disincentive for network investment.

– Whereas "best effort" public Internet does not necessarily imply a low performance, it should nonetheless remain "good enough." Any policy intervention should be directed at reducing the digital divide (instead of promoting a "two-tier" or multi-tier" Internet access).

– PSM understand that end-users' problems arise due to peak-time congestion. PSM are committed to take up responsibility to help alleviate congestion and to improve end-to-end network performance (e.g. use of CDNs to minimize network load). CDNs are a great way to improve the viewer quality of experience. PSM also adopted other measures such as the adoption of improved compression technologies or the use of broadcasting signals in hybrid devices to minimize network congestion.

– Another way to optimize traffic flows may be a right to co-location which enables content providers to install caches or edges as close as possible to the end-users. The current provisions of Directive 2002/19/EC (Access Directive) in particular Article 12 (1) (f) could be considered to include the right of co-location in (last mile) IP- networks.

– All operators at the interconnection market should use techniques that optimize the use of bandwidth available in the network. It has been proven that Multicast, the 27 year old technique that requires some sort of interconnection, reduces traffic load in the best effort network in many instances. Despite this advantage there are still operators who have not implemented this. Inefficient use of this sort should be avoided in the future. The EBU would welcome a debate on how to create the right conditions and incentives for enhanced use of efficient techniques that maximise the availability of bandwidth and optimize the data traffic. This debate should be coordinated with the debate about measures to promote the use of efficiency requirements for spectrum allocation for wireless broadband.

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networks, it may be profit maximising for ISPs to charge content and application providers and slow down the roll-out and adoption of superfast broadband. It has been argued that in competitive markets, incumbents might be incentivised to invest in superfast broadband in order to differentiate themselves from their competitors, who consist mainly of unbundlers reliant on current-generation platform. However, it is likely that unbundlers would compete away the incremental revenue they raised by charging CAPs into lower retail prices in order to retain customers. The net impact would likely be a slowing down of the NGA roll-out and uptake.

EBU comments on the BEREC draft report on differentiation practices and related competition issues - BoR (12) 31

1. The EBU congratulates BEREC for its comprehensive description of the Internet value chain and recent trends, as well as for its thorough assessment of differentiation practices and their potential impact on end-users. Please find below some detailed comments on the draft report which should be considered in light of the observations included in the general cover note accompanying this reply.

2. As BEREC recognizes in its draft report, **the openness and non-discriminatory features of the internet are key in terms of innovation, economic efficiency and citizens' access to information**.[3] BEREC's main approach to looking into the economic effects of differentiation practices for the end-user should thus be welcomed.

At the same time, the open internet is also a platform for the expression of diverse and plural opinions, where citizens can freely and interactively engage in dialogue (a key feature of democratic societies). By relying on specific traffic management tools, network operators can act as gatekeepers for data traffic flows to the end-users, which entails the risk that users may not have full access anymore to a plurality of information and quality content of their choice. A conceptual framework assessing the potential impact should in our view therefore also take on board repercussions that differentiation practices may have on issues such as freedom of speech and plurality of voice.[4]

Such an approach is fully compatible with the logic behind the EU (telecoms) Framework Directive which stated that "the separation between the regulation of transmission and regulation of content does not prejudice the taking into account of the links existing between them, in particular in order to guarantee media pluralism, cultural diversity and consumer protection."[5]

In addition, BEREC has to follow the same objectives as those of the national regulatory authorities (NRAs)[6] which include contributing "to ensuring the implementation of policies aimed at the promotion of cultural and linguistic diversity, as well as media pluralism".[7]

3. **Offering high-quality content and applications on the open internet is a key driver for broadband usage and Internet access demand**. We welcome the fact that BEREC recognizes Content and Application Providers (CAPs) as one of the major economic entities in the Internet value chain.[8] Public service media (PSM) are important investors in the provision of high quality and diverse content (ranging from drama, human interest programming to impartial information and news delivery) and

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[3] BEREC draft report, para 307-308.
[4] BEREC draft report says that concerns relating to issues such as freedom of expression *"are not the focus of the report, and should be examined in the light of relevant legislations."* (para 15)
[5] Recital 5 of Directive 2002/21/EC (Framework Directive) as revised by Directive 2009/140/EC and Regulation 544/2009.
[6] Article 1 (3) of Regulation (EC) No 1211/2009.
[7] Article 8 of Directive 2002/21/EC (Framework Directive) as revised by Directive 2009/140/EC and Regulation 544/2009.
[8] BEREC draft report, para 49.

have seized the opportunities offered by the Internet to develop and offer content to citizens in the EU and beyond.

Over the past decade, PSM have strengthened their online presence and most PSM offer catch-up video services and live streaming[9] of their programmes. As these services are popular, it is fair to say that such content offerings render the ISP's internet access offer more attractive and drive the demand for Internet access. As recognised by BEREC, end-users also pay for their internet connection with the expectation that they will be able access content and applications.[10] The same end-users would also have growing quality expectations from high-bandwidth connections which have become increasingly wide-spread.

4. The internet ecosystem is a complex environment with many players between the end-user and the content and application provider. The EBU shares BEREC's observation that the "[a]pplication of the two-sided market theory is limited by the fact that the Internet does not consist of a single platform where prices structures on both sides are coordinated."[11]

A two-sided market analysis for the Internet is not appropriate as the Internet does not involve one single intermediate player offering a full service (including the necessary guarantees for quality of the delivered content) in return for remuneration. On the contrary, CAPs engage with a range of intermediaries to secure the delivery of their content to the end-user and they pay for these connectivity services (to HCPs). They often also invest in infrastructure themselves. BEREC recognizes this as well as the fact that both these payments and the one made by end-users (payments on the edges of the Internet) have brought the Internet where it is now.[12]

In this respect, we also share BEREC's view that **the term "zero price" rule is misleading**.[13] The term "no commercial practice" better reflects the current relationship between CAPs and ISPs providing end-user connectivity. However the contribution of CAPs should always be assessed in the light of their role in the broader internet value chain including the different types of commercial IP interconnection agreements. We believe that the qualitative information provided in the draft report on IP interconnection thus complements the present draft report very well.

We also warmly welcome BEREC's conclusion that "a complete analysis is needed firstly to measure in an appropriate manner all forces engaged in this process"[14] before making any assessment on the future relationship between CAPs and ISPs.

6. We welcome BEREC's accurate description of the different incentives behind differentiation practices (both in case of vertically integrated end-user connectivity providers (ECPs) and in the absence of vertical integration).[15]

In this respect, the EBU would like to stress the **importance of appropriate tools providing reliable and real-time traffic data** which would enable efficient mapping of

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[9] The scope of the content offer differs from one broadcaster to another. Some broadcasters offer most of their content through live streaming, while for most this service covers specific channels, special programmes or events.
[10] BEREC draft report, para 308. See also para 151.
[11] BEREC draft report, para 162.
[12] BEREC draft report, para 308 and para 62.
[13] BEREC draft report, para 59.
[14] BEREC draft report, para 332.
[15] BEREC draft report, para 21-23.

the actual differentiation practices by ISPs and which would give the public real understanding about how their internet connection works and how traffic is managed. Tools of this kind would also be helpful for NRAs to check whether BEREC's conclusion that "negative differentiation [with regard to services delivered to CAPs] is unlikely in a competitive market" is actually valid in the different Member states.[16]

PSM are faced with growing amounts of complaints by end-users with regard to online video consumption. In order to be able to better service their audiences, PSM in various Member states (e.g. BBC, IRT, VRT, NPO and ARD) have started to develop specific software to track problems and identify where these problems lie (with the end-user, with the network operator or with the broadcaster). These tools should demonstrate differentiation practices and enable PSM to improve together with their ISP partners the Quality of Experience of the audiences."

7. The EBU is of the opinion that, **as a general principle, ISPs should not be allowed to block any content**.

At the same time, we understand that problems experienced by end-users are often the result of peak-time congestion. Alongside investments in additional bandwidth capacity, we believe that there are a range of techniques which specifically reduce the congestion burden. PSM in several Member states have taken their responsibility in alleviating network congestion through the use of content delivery networks (CDNs) to reduce the overall network capacity.

We thus welcome the fact that BEREC recognizes the specific merits of new innovative techniques like CDNs and peer-to-peer communication for enhanced network architecture for high capacity best effort communication.[17] In addition, PSM have also adopted measures which enhance overall technical efficiency (such as the adoption of improved compression technologies or the use of broadcasting signals in hybrid devices to minimise network congestion).

8. As rightly pointed out by BEREC, competition at the retail level is a key element which could potentially deter ECPs from implementing differentiation practices which harm the end user.[18] **Major price differences currently still exist between EU Member States at the retail level,**[19] which means that transparency and competitiveness levels need to be improved in a number of fixed and mobile broadband access markets.

Furthermore, the EBU believes that there is a danger that ISPs could collude to degrade the best efforts internet as a policy to such an extent resulting in content providers having to purchase managed services to ensure quality of service. This would require special scrutiny by national regulatory authorities to address the risk of anti-competitive arrangements and prevent new forms of traffic discrimination to arise.

9. Whereas competition rules should theoretically address any anti-competitive behaviour, **competition law alone cannot be relied upon to safeguard an open internet** given that it requires a long and costly *ex post* investigation. By the time they are implemented, ex-post measures cannot always undo the harm already done. The

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[16] BEREC draft report, para 302.
[17] BEREC draft report, para 71 and 74.
[18] BEREC draft report, para 336-337.
[19]http://ec.europa.eu/information_society/digital-agenda/scoreboard/docs/pillar/study_broadband_access_costs.pdf

network effects of the open Internet and the ability to scale fast are important for successful market participation by CAPs. The threat of discrimination or actual discrimination could discourage market participation by CAPs at an early stage. It would raise the entry barriers to the open internet and thus be a disincentive to invest or innovate by CAPs while giving the network operator the opportunity to seek to dominate the market.[20]

Furthermore, the "**Significant Market Power" (SMP) threshold may be unsuited to assess the impact of traffic differentiation practices and to secure the open Internet** because ISPs may have "gatekeeper" power without having SMP in the conventional sense.[21] A network operator could indeed have an incentive to exclude a market rival and hamper end users' access to new services and content without necessarily being able to profitably raise prices above some competitive level.

The EBU therefore supports BEREC's conclusion that competition as such is not sufficient to safeguard an open internet including an adequate output for end users. The EBU is in favour of specific mechanisms for swiftly identifying problems in the market and detecting operator's exclusionary behaviour at an early stage. It considers preventive/proactive monitoring as an essential tool to pinpoint and subsequently address problems of degradation with regard to the Internet access as a whole as well as individual Internet applications (even in the absence of a SMP). To this end, **the EBU would support a common European high-level approach to ensure a consistent and effective implementation of monitoring mechanisms of that kind by NRAs**.

10. The EBU welcomes BEREC's conclusion that **consumer awareness with high degree of transparency**, as well as the possibility for end-users to switch easily and in a cheap and fast way, place pressure on ISPs implementing restrictive practices.[22] Monitoring differentiation practices (as highlighted above) is not just about preserving the incentives for existing or new entrants to provide improved content and applications, but ultimately and foremost about serving the end-user's access to a good quality and reasonable priced best effort Internet.

Whereas it welcomes BEREC's activities in the specific work stream on transparency (as reflected in the 2011 guidelines), the EBU would like to underline that **real-time (rather than theoretical) information about Internet traffic delivery is what matters the most for the end-user** and should be made available in order to enable end users (or third parties) to check if a ISPs is delivering what it promises to offer in the internet access subscription.

Internet end-users alone will quite often not be in the right position to identify and locate the cause of problems in their internet viewing experience. As mentioned earlier, PSM started developing specific software to track problems in order to assist their audiences. The EBU would welcome opportunities to exchange experience and information regarding measurement tools.

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[20] Plum, The open internet – platform for growth, October 2011, pages 32-33.
[21] Ibid.
[22] BEREC draft report, par 337.

EBU comments on the BEREC draft Guidelines for Quality of Service in the scope of Net Neutrality (BoR (12) 32) - 29 May 2012

General remarks

The EBU welcomes the opportunity to comment on BEREC's well-balanced Draft Guidelines for Quality of Service in the scope of Net Neutrality.

Effective, consistent implementation and enforcement by Member States of the Telecom package net neutrality principles (i.e. freedom of access, transparency, non-discrimination and quality of service) is a key condition/prerequisite for guaranteeing an open Internet. Member States' legislation should ensure that everyone can access and distribute the content or run applications and services of their choice, on the device of their choice.

The Internet's open character has been a key driver of innovation. It has led to spectacular levels of development in online applications, content and services and thus growth in the offer and the demand for content and service. Moreover, net neutrality will be of increasing importance, and particularly in the connected TV world. ISPs' traffic management practices, access and interconnection issues are at the heart of today's broadcasters' main concerns.

The EBU especially supports BEREC's approach in stressing the inevitable link between the regulation of transmission and the regulation of content, and the importance of taking into account the general interest objectives such as: "*freedom of expression, media pluralism, impartiality, cultural and linguistic diversity, social inclusion, consumer protection and the protection of minors*" (page 10), when considering Article 22(3) USD on minimum quality of service requirements.

Net neutrality principles are a fundamental instrument (as are must-carry rules on broadcasting networks) to preserve fundamental public policy objectives such as pluralism and cultural diversity and to enable public service media to carry out their public service mission on the open public Internet.

The EBU endorses BEREC's distinction between Internet access services (IAS) (best effort) and specialised services (SS) (i.e. IPTV) (pages 4 and 16) and various definitions. Whereas SS are able to guarantee QoS, IAS have no guaranteed characteristics. However, they may offer quality of experience (QoE) for the end-user. In general, any definition would need to be an evolving and dynamic concept, regularly reviewed and improved in order to reflect changing user expectations.

Moreover, it is of fundamental importance that SS should not be offered or given preferential treatment by ISPs at the expense of the development of IAS and should not prevent access to services provided by PSM with "sufficient" quality of service. The public service value of the Internet should not be harmed.

The EBU agrees with BEREC that *in cases where the capacity for SS is provided at the expense of Internet access services, QoS might also apply to SS and* should not focus only on quality conditions on the Internet access service (public Internet) (page 16). It should also be stressed that there are offers of high-quality service on managed

services (IPTV) which are not open to all interested content providers, and this could lead to discrimination and distortion of competition.

Quality of the Internet access service is of prime importance for both end-users and content-providers CAPs (i.e. broadcasters), and in particular by addressing discriminatory behaviour from ISPs as regards their traffic management practices. It is in broadcasters' interests that the end-users have access to their content and services with sufficient quality and that ISPs respect the principle of transparency and inform their subscribers of their traffic management practices.

End-users expect the Internet to be accessible, reliable, secure and fast all the time, irrespective of who owns it and who runs it. It is thus critical for ISPs to provide QoS meeting end-users' needs and expectations. In this context, as stressed by BEREC, *the ability of the end-user to switch provider or tariff, and how easy this is, will be a key element when consideration is given to whether it is necessary to impose minimum QoS requirements.*

In general, the EBU welcomes BEREC's comprehensive analysis and clarity about the extent and scope of the different regulatory tools available to NRAs to intervene in case of a degradation of service. The identification of specific criteria and methods to monitor quality (proactively or reactively) and assess whether it is necessary to apply minimum QoS requirements will be of great help for NRAs. However, certain aspects (i.e. "reasonable" or "acceptable" traffic management practice) might be developed further (see the answers to the questions below). Ultimately, active enforcement and monitoring by NRAs will be a prerequisite.

QUESTIONS

1. The criteria proposed for the assessment of degradation of Internet access service as a whole? (Ref. chapter 4)

The EBU welcomes the identification of common quality parameters (page 43) to monitor (e.g. quality of IAS over time; IAS speed; level of congestion; performance of IAS v. SS; measurements of timing parameters (i.e. latency or jitter); quality as perceived by end-users). It might be stressed that "IAS speed" alone is not sufficient. Sustainable speed necessary to carry video should also be mentioned. Moreover, "blocking and throttling of data packages" should also be part of the measurable parameters.

According to the transparency principle, those minimum requirements/parameters should be specified by the ISPs in their subscription contracts with end-users and carefully monitored and measured by independent third parties. More concretely, those parameters might be explained to the end-consumer by a traffic light labelling (comparable to EFSA or EU energy labels) for example.

The EBU agrees with BEREC that end-users should have access to the appropriate (software) tools to enable them to measure and monitor the actual parameters of their connection. In addition, those tools should be made freely available to all subscribers.

2. The criteria proposed for the assessment of issues regarding individual applications run over the Internet access service? (Ref. chapter 5)

There is a need to clarify or develop further common key elements to determine what is or is not a "reasonable" legitimate or acceptable traffic management practice. The outlines remain unclear (page 54).

3. The aspects proposed regarding the conditions and process for regulatory intervention? (Ref. chapter 6)

As stated by BEREC, the different regulatory tools may act independently or complementarily to each other, taking into account the specific circumstances of the case and also the market dimension (i.e. degradation of IAS as a whole or related to specific ISPs) (page 56). Moreover, it should be stressed that NRAs must use the full extent of tools at their disposal as certain regulatory means, such as competition rules, transparency requirements, etc., might be deemed insufficient to address degradation of service and ensure quality of service.

The EBU supports BEREC's approach when, in certain situations, it is necessary to impose minimum QoS requirements immediately, the implementation of other remedies (*ex ante* rules and *ex post* competition law) being too long and complicated (e.g. not appropriate to the fast-moving Internet markets and not applicable when operators do not have SMP). This flexibility is much appreciated (page 57).

More emphasis should be placed on the determination of minimum QoS requirements (i.e. the combination of functional/qualitative or/and technical/quantitative requirements (pages 23, 58,59) and how NRAs or actors in the free market are able to measure QoS (i.e. what the measurements tools are and which parameters can be measured) and to verify ISPs' compliance. As already stressed by BEREC, this needs to be examined once again, and the EBU would very much welcome the opportunity to exchange experience and information regarding measurement tools and the information about the data traffic ISPs should report.

Broadcasters may help in so far as they are developing software to measure quality of experience of the end user. Such software should also help to identify the origin of experienced problems, if the source is encoding (broadcast domain), the transport over the internet (responsibility of ISP, IXP, etc.) or a local player/device problem (problem of the end user). The BBC, IRT, VRT, NPO and ARD are running projects developing code in this area.

This data could also be used in a network neutrality tool when it reports on what is happening in the network when data packages are transported: Are they delayed or blocked, what is the sustained speed delivered by operators in the network or even what network management tools are used? There might be scope for a European research project in this area. BEREC could also suggest that the Commission explores ways of enforcing reporting about data travelling over ISPs' networks.

Finally, considering the high-level regulatory process description, it would be worth encouraging NRAs to put in place appropriate and effective mechanisms for the users and content providers or any affected stakeholder to alert or report incidents and problems and to discuss regularly developments and best practices.

4. To what extent are the scenarios described in these guidelines relevant with respect to your concerns/experience? Are there additional scenarios that you would suggest to be considered?

As a general principle, ISPs should not be allowed to block any content.

ISPs traffic management practices on the public open Internet should be kept to a minimum and should be allowed only in specific cases (i.e. to alleviate congestion on the network during peak times and to comply with a legal justification or Court order).

Discriminatory and anti-competitive traffic management practices shall be prohibited.

From the perspective of end-users and content providers, differentiated treatment of traffic or differentiation of practices shall be allowed as long as the same types of services are treated equally.

There could be optimisation but no prioritisation of data flows to decrease traffic congestion in hubs. For example the use of Content Delivery Networks (CDN) is a technical solution to optimise data flows. Global CDNs reduce the traffic load at network hubs that are bypassed via peering arrangements. The more traffic that is handled by CDNs the more capacity for other traffic will be available with the result that chance for congestion at busy network hubs is decreased.

It might be asked why P2P is considered a special case (page 36), even though the quantity of P2P traffic is declining it is still a viable technique that in specific (non star shaped) network topologies improves the data traffic flows. The European Project subsidised under the seventh framework programme P2P-NEXT is describing these features in detail.

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EBU comments on the BEREC draft report "An assessment of IP-interconnection in the context of Net Neutrality" (BoR (12) 33) - 29 May 2012

General remarks

1. The EBU welcomes the opportunity to comment on BEREC's draft report "An assessment of IP-interconnection in the context of Net Neutrality." It contains a balanced and comprehensive description of the different interconnection agreements as well as the recent trends along the value chain.

    The EBU welcomes the inclusion of the IP interconnection assessment in its work streams on net neutrality. **Today's interconnection arrangements reflect the best effort principle** and have so far been crucial for the Internet's contribution to growth and innovation and for end-users to reach all destinations on the Internet. Public service media (PSM) acknowledge this: it is reflected in their engagement to secure the delivery of their content to the end-user with a range of intermediaries and in the fact that they pay for hosting, connectivity and CDNs. The EBU therefore welcomes BEREC's conclusion that there seems to be no free-riding problem (page 48).

2. The EBU believes that **investment in additional capacity and advanced technical solutions for efficient traffic delivery should go hand in hand** and are key to secure the open nature of the Internet. These are the best guarantees for an optimal viewer experience.

    We welcome the fact that BEREC recognizes that there are different mechanisms in the best effort networks for improving end-to-end network performance (and therefore the QoE), including CDNs (page 49). In our view, congestion at interconnecting hubs is generally best prevented by caching popular content as deep as possible in the network. Other techniques that will help to do this are Open and Transparent caches and/or the possibility for CAP's to co-locate caches in third party networks.

3. The EBU also identifies **a range of other advanced techniques to optimise data traffic** in best effort networks.

    This is the case for P2P in a real decentralised network[3], eMBMS[4] on wireless broadband networks and the Multicast technique. Multicast is an important technique for one-to-many communication that would reduce network congestion and improve QoE tremendously during live broadcasts over internet or for pre-caching popular content. The Multicast technique is an established technique but requires some sort of interconnection of networks. It is currently not used in best effort networks because some actors in the network do not support it.[5] eMBMS is the broadcast mode of LTE. When a lot of CAUs request the same content (Live video or pre-caching) in a mobile network it is much more efficient to broadcast the content from a base station instead of setting up

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[3] P2P in a star shaped network is not an efficient technology because the tromboning effect would generate even more traffic at the main hubs.
[4] EMBMs stands for "Evolved Multimedia Broadcast Multicast Service."
[5] There is no official reason why it is not used by some operators. It is often speculated that creating scarcity or the option to sell more traffic (because of inefficient use) is the real motivation.

a lot of individual Unicast connections. It is currently not deployed in newly installed LTE networks. It seems that it is not in the best interest for data transport providers to use the most efficient technique, perhaps because one can earn more setting up Unicast connections.

The EBU would welcome a debate on how to create the right conditions and incentives for enhanced use of efficient techniques that maximise the availability of bandwidth and optimize the data traffic. This debate should be coordinated with the debate about measures to promote the use of efficiency requirements for spectrum allocation for wireless broadband.

4. The EBU welcomes BEREC's acknowledgment of the **increasing role of CDNs** and agrees that the content providers' scale influences the decision to buy or make CDN services. However it does not necessarily imply that operating its own CDN would only be interesting for a global content provider.

    CAPs which mainly operate locally, such as PSM in a specific country or language domain, often have more/better peering relationships with local ISPs than global CDNs have. In that situation, a global CDN does not deliver interconnection advantages. This could make the scenario viable in the future for such a broadcaster to use their own CDN.

    At the same time, PSM in larger countries do not necessarily have more interconnections with ISPs than the global CDNs. They already use different CDNs to offload their content, optimising data flows by directing traffic to the CDN that has the best capacity at that moment in time. In these markets CDN-Overlays and CDN-Federations will become more important in the future.

5. The EBU shares BEREC's observation that the IP interconnection agreements have developed so far without any significant regulatory intervention, but would **invite BEREC to deepen its reflection on the different regulatory tools available under the Telecom package**.

    We welcome BEREC's analysis of the different obligations to interconnect which may be imposed to operators whenever one party denies a plea for interconnection and thus would be able to take customers hostage (page 44). This particularly matters to PSM, which have the obligation to render their content universally available across platforms.

    We would suggest giving further consideration to the application of Article 12 (1) (f) of Directive 2002/19/EC (Access Directive) for the right to place caches in IT networks. One could argue that, just like the right to place antennas in a communication tower, broadcasters (and other CAPs) should have the right to place caches in IP-Networks in order to be able to reach all citizens.

    In general, the universal service mechanism is a useful tool to reach digital inclusion. The extension of this mechanism to the best effort Internet should thus be part of a broader reflection process on a comprehensive policy approach to secure the EU "broadband for all" objectives, alongside measures to promote the use of minimum coverage and quality requirements for spectrum allocation for wireless broadband. The extension would be coherent with Article 22 (3) of Directive 2002/22/EC (Universal Service Directive) which offers the possibility to set levels for minimum quality of service, to prevent degradation of service or a hindrance or delay in traffic over the Internet.

6. We welcome BEREC's analysis that the **Internet traffic increase does not imply an increase in network operators' costs if traffic costs per unit are considered**. In fixed networks, the increase of data of CAPs travelling to CAUs over third party networks does indeed not imply a substantial increase of overall costs of network owners and the latest mobile network technology has also reduced the cost of carrying costs for a given capacity (page 34).

7. The EBU wishes to stress the **importance of the issue of DSLAM overbooking**. Even if it were possible to optimise all traffic flows at the level of the interconnection market, the DSLAMs could still be a bottleneck preventing the occurrence of QoE. At peak media consumption hours, consumers often share their ISP connection with their neighbours connected locally which results in a reduced QoE.

Questions and Answers

Question 1 (Chapter 2): Are any other important players and/or relationships missing?

Answer: No, the description is complete.

Question 2 (Chapter 2): Do you agree with the classifications of CAPs as outlined above?

Answer: Considering the amount of content broadcasters are uploading to the internet and the tremendous user demand for this content, Broadcasters should be part of the example list. Proposed text: - Live and On Demand radio and video services: e.g. Broadcasters.

Question 3 (Chapter 2): Do you agree with the classifications of CAUs (Content Application User) as outlined above?

Answer: The fact that a lot of DSLAM connections to the CAUs are overbooked should be mentioned in the cost paragraph of CAUs. This is an important factor in the pricing model of ISPs for CAUs and an important bottle neck in the service delivered (especially during peak hours of media consumption). Also, the traffic aggregator behind the DSLAM or comparable network elements, e.g. in broadband cable networks, are not discussed and can perform as a bottle neck.

Question 4 (*Chapter 2): Do you agree with the classifications of ISPs as outlined above?*

Answer: The fact that a lot of DSLAM connections to the CAU are overbooked is also relevant in the cost paragraph of "Eyeball ISPs" for the same reason as in Question 3.

Question 5 (Chapter 2): *Do you agree with the classifications of CDNs as outlined above?*

Answer: CDNs are often paid by broadcasters for hosting services related to video distribution, encoding/transcoding and distribution services optimised for a multi device playout environment. CDNs are not only paid for optimising data flows related to

distribution of media content over the internet. Those extra offerings can be interesting for broadcasters because they do not have to manage their own encoding/distribution platform (Lower CAPEX, less management costs, no transit costs and less effort needed in managing distribution optimisation).

Question 6 (Chapter 3): *To what extent are requirements regarding traffic ratios still important in free peering arrangements?*

Answer: Not really, in the case of broadcasters asymmetric data flows are part of the barter peering relation and accepted because of the net benefit for both parties (see answer 8).

Question 7 (Chapter 3*): To what extent does the functioning of the peering market hinge on the competitiveness of the transit market?*

Answer: Overall the free peering relations with broadcasters are more beneficial for ISPs than the reduction of transit income generated from broadcasters (see answer 8 and 10).

Question 8 (Chapter 3)*: Does an imbalance of traffic flows justify paid peering?*

Answer: No it does not, peering relations are mutually important. Advantages for ISPs are less transit costs related to traffic with IXPs and optimisation of large data flows generated by video for a better QoE provided to their CAU customers that request the media. Audiovisual media consumption is an important driver for sales of internet connections to CAUs. Conversely, it obviously provides a benefit for the broadcaster [e.g by increasing the total available output bandwidth and thus reach].

Question 9 (Chapter 3)*: Does paid peering increase (number of contracts and volume handled under such contracts)?*

Answer: We are not aware of any broadcaster paying for peering for reasons mentioned in answer 8.

Question 10 (Chapter 3)*: To what extent does regional peering increase in relevance and affect transit services?*

Answer: Regional peering increases in relevance for broadcasters because it optimises data flows to their audience. The decrease of transit related traffic reduces congestion in the backbone.

Question 11(Chapter 3)*: Are any important services missing from the list of services provided by IXPs?*

Answer: No.

Question 12 (Chapter 3)*: Are there any further developments regarding IXPs to be considered?*

Answer: No

Question 13 (Chapter 3)*: Should in future Europe evolve to have more decentralised IXPs closer to CAUs?*

Answer: If possible yes, but this model only generates advantages in decentralised network topologies. In star shaped network topologies (like the ones in the Netherlands, Belgium and other smaller countries) all traffic will travel via the central hub anyway. What will help to optimise traffic flows in those situations is a right for co-location which enables CAPs to install caches or edges as close as possible to the CAUs. When CAPs can address caches deep in the network they could run their own CDN. Because a broadcaster knows what content will be popular it can pre-load those caches and reduce the change for congestion in the network as a whole tremendously. This kind of solutions can also be created by techniques like Transparent or Open caches when the ISP provides caches that can be accessed directly by content providers.

BEREC affirms that ISPs can use the last mile connection to force CAPs in paying for reaching their customers (p. 40). Even though there are not many cases that this method succeeded it is a potential problem in privately held closed networks. Therefore the EBU would argue for considering the right to co-location in (last mile) networks (see Article 12 (1) (f) of the Access Directive). One could argue that, just like the right to place antennas in a communication tower, broadcasters (and other CAPs) should also have the right to place caches in IP-Networks.

Question 14 (Chapter 3)*: Will traffic classes ever become available in practice on a wide scale?*

Answer: Yes, traffic classes within one network exist. Examples are Australian and New Zealand ISPs that sell data capped internet services. A local run IPTV services by an ISP is another example. We should separate between data classes to end consumers and traffic classes in the traffic between network operators (B2B). In the latter case, trunk prioritization and trunk access management are common. IPTV and volume caps are typical for B2C.

Question 15 (Chapter 3)*: Will interconnection for specialised services be provided across networks?*

Answer: Yes, even though IPTV services are mostly managed by a local ISP, it can be expected that such services will be managed centrally in the future. IPTV is not an ISP topic per se, but it is an end to end management issue. Traffic is managed from the service provisioning and management platform (playout) to the terminal equipment of the consumer.

Question 16 (Chapter 3)*: Will other solutions for improving QoE like CDNs become more successful rather than traffic classes?*

Answer: The options in the questions are not mutually exclusive. In the open internet congestion is not resolved by generating traffic classes. CDNs are more profitable from the perspective of maximizing data throughput and will also be effective in a managed lane.
In relation to the requirement of some sort of interconnection to improve the QoE it is interesting to look at Multicast. The 27 year old technique is commonly known for its

improvement of distribution scenarios when the same content is requested at the same time by different CAU. In other words when a one-to-many (broadcast) solution reduces the amount of data that needs to be transported over the network compared to the case that multiple individual one to one connections are set up. Both the equipment of CAPs and CAUs are supporting Multicast but the technique is not applied by a lot of ISP's.

Other examples of technical solutions that can improve the QoE and require some sort of interconnection of networks are Transparent and or Open caching.

Question 17 (Chapter 4)*: Which of the factors impacting on the regionalisation of traffic is most important: language, CDNs, direct peering?*

Answer: Language is not a problem. The other factors are relative to the local network topology. Direct peering helps to relief public peering points. With a CDN also other bottle necks in the network are avoided without prioritizing traffic.

Question 18 (Chapter 4)*: Are any further issues missing?*

Answer: Yes. We would also like to draw your attention to the particular situation of vertically integrated operators which combine network transport activities and the provision of content and applications. Companies of this kind have no interest (and may even not have the ability) to strictly separate the accounting of the internal content services from the transport cost – which is needed to have a transparent justification of fees asked for the transport.

Question 19 (Chapter 4)*: Given the cost reductions and the economies of scale and scope observable in practice, why do network operators call for compensation?*

Answer: The volume of subscriptions sold has put pressure on the network which now requires investments. However, consumer willingness to pay will be shaped by the quality of the services and content they can receive. Video has been seen as a key driver of uptake of new products such as superfast broadband (eg. by Ofcom). The investment by PSM in great content and their willingness to make it available should improve the economics of network investment – not require compensation for it.

Question 20 (Chapter 4)*: Do you subscribe to the view that CDNs lead to improvement of QoS without violating the best effort principle?*

Answer: One should not confuse QoS with QoE. CDNs used in a best effort network do not lead to improvement of QoS, but they improve the QoE and the overall working of internet. It does not violate the best effort principle.

Remark: In chapter 4.4.4 the paragraph "From a content providers perspective ... scale and scope" is not totally accurate. Network topology is not taken into account. In smaller countries with only a limited amount of ISPs a content provider can better concentrate on arranging their own peering relations with the main ISPs when third party CDNs have only few peers available in that region.

Question 21 (Chapter 4)*: Is there a trend for CDNs to provide their own networks (i.e. integrating backwards)?*

Answer: Yes, examples are Google, Facebook, Level3*.*

Question 22 (Chapter 4)*: Is there a general tendency for eyeball (CAU) ISPs to deploy their own transit capacities and long distance networks or even to become Tier-1 backbones?*

Answer: Yes, only the big ISP's. Normally those ISPs also market content services (local Tier1) and can consider OTT services as cannibalising.

Question 23 (Chapter 4)*: If an eyeball ISP becomes Tier-1 provider, does this increase the eyeball's market power on the interconnection market because there are no alternative Tier-1 providers to reach the customers of this eyeball ISP?*

Answer: Yes, they have the potential to close it for their own services. The market stays open only when there are more ISPs (and in fact local ones do not survive). The market power is also used to push barter peering relation to paid peering or private CDN services.

Question 24 (Chapter 5)*: Will Art. 5 become more relevant as some large Eyeballs have equally qualified as Tier 1 providers not having to rely on transit anymore?*

Answer: Yes, to overcome their network monopoly and natural incentive to protect their services over alternative ones (both for CAUs and CAPs). This situation can also be overcome by a right on co-location in order to keep the network open.